

Vapor Intrusion Criteria and Screening Levels

Section XXXX. Vapor Intrusion Criteria and Screening Levels.

- (1) The department shall establish vapor intrusion cleanup criteria and screening levels that shall be used to evaluate the vapor intrusion exposure pathway.
- (2) Inhalation of hazardous substance vapors volatilizing from groundwater and soil to indoor air shall be considered a reasonable and relevant exposure pathway for hazardous substances that have a Henry's law constant greater than or equal to 0.00001 atm-m³/mole.
- (3) The Indoor Air Criteria shall be calculated as shown below:

(a) For carcinogens:

$$IAC = \frac{TR \times AT \times AIR}{IURF \times EF \times ED}$$

where,

<i>IAC</i>	Indoor Air Criterion	= chemical-specific, ug/m ³
<i>TR</i>	Target risk	= 1.0E-05
<i>AT</i>	Averaging time	= 25,550 days (70 years x 365 days)
<i>AIR</i>	Adjusted inhalation rate	= 1 (residential) = 2 (non-residential)
<i>IURF</i>	Inhalation unit risk factor	= chemical-specific, (ug/m ³) ⁻¹
<i>EF</i>	Exposure frequency	= 350 days/year (residential) = 245 days/year (non-residential)
<i>ED</i>	Exposure duration	= 30 years (residential) = 21 years (non-residential)

(b) For noncarcinogens:

$$IAC = \frac{THQ \times AT}{(1/ITSL) \times EF \times ED}$$

where,

<i>IAC</i>	Indoor Air Criterion	= chemical-specific, ug/m ³
<i>THQ</i>	Target Hazard quotient	= 1
<i>AT</i>	Averaging time	= 10,950 days (30 years x 365 days) residential = 7,665 days (21 years x 365 days) non-residential
<i>ITSL</i>	Initial threshold screening level	= chemical-specific, (ug/m ³)

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<i>EF</i>	Exposure frequency	= 350 days/year (residential) = 245 days/year (non-residential)
<i>ED</i>	Exposure duration	= 30 years (residential) = 21 years (non-residential)

(4) The Soil Gas Criteria shall be calculated as shown below:

$$SGC = \frac{IAC}{\alpha}$$

where,

<i>SGC</i>	Soil Gas Criterion	= chemical-specific, ug/m ³
<i>IAC</i>	Indoor Air Criterion	= chemical-specific, ug/m ³
α	Attenuation coefficient, or alpha value	= 0.02 (unitless, sub-slab) = 0.002 (unitless, deep)

and where, soil gas data collected from a depth of five feet or greater below ground surface shall be compared to the deep soil gas criteria and soil gas data collected sub-slab shall be compared to the sub-slab soil gas criteria.

- (5) A site-specific response activity may be pursued according to subsection XXXX of this part that is based on demonstration of compliance with 1974 PA 154, MCL 408.1001 et seq. and the rules promulgated pursuant to that act. This subsection shall apply only when all of the following conditions are satisfied:
- The risk being evaluated results from inhalation by workers of hazardous substances in indoor air within an active workplace that is regulated by 1974 PA 154, MCL 408.1001 et seq. and the rules promulgated pursuant to that act. The workplace in question shall be currently and actively in the process of a Michigan occupational safety and health administration monitoring program.
 - The exposure to hazardous substances from environmental contamination is a portion of the exposure to which workers are otherwise subjected to from process-related sources or other work-related sources of the same hazardous substance.
 - The risk to the non-worker population, which includes but is not limited to visitors, patrons and clients, from inhalation of indoor air at the workplace has been evaluated using unrestricted residential indoor air or soil gas criteria or a site-specific evaluation has been conducted for the non-worker population according to methods approved by the department, and the risk and hazard levels described in subsection XXXX are met.

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(6) The Groundwater Vapor Intrusion Screening Levels shall be calculated as shown below:

$$GW_{VI}SL = \frac{IAC}{\alpha \times H' \times TAF \times 1000 L/m^3}$$

where,

$GW_{VI}SL$	Groundwater Vapor Intrusion Screening Level	= chemical-specific, ug/L
IAC	Indoor Air Criterion	= chemical-specific, ug/m ³
H'	Dimensionless Henry's law constant, where $H' = HLC \times 41$	= chemical-specific, unitless
TAF	Temperature adjustment factor	= 0.5
α	Attenuation coefficient, or alpha value	= 0.001, unitless

(7) An exceedance of a groundwater vapor intrusion screening level shall require an evaluation to determine facility status.